

Baumann™ Actuator Instructions

(English - Metric Version)

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INTRODUCTION

The Baumann™ multiple-spring diaphragm actuators are powerful and compact devices designed to operate control valves, louvers, dampers or mechanical speed adjusting devices. The actuators can provide either direct air-to-extend action (ATE) or reverse air-to-retract action (ATR). When an ATE actuator is installed on a typical Baumann valve, it provides an air-to-close (ATC) or fail-open function. When an ATR actuator is installed, it provides an air-to-open (ATO) or fail-closed function. The design features exceptionally low hysteresis due to the absence of side loads imposed by misalignment of single coiled

springs. The use of multiple springs also offers a substantially lower profile. The units include zinc-plated, epoxy-coated steel diaphragm cases and, except for the type 16, an epoxy-coated ductile-iron yoke. All remaining metal parts are made of either stainless or zinc plated steel for optimum corrosion resistance. All actuators are suitable for a standard ambient temperature range of -20°F to 160°F (-29°C to 71°C); for higher temperature service, an optional design is available, consult the factory.

SCOPE OF MANUAL

This instruction manual includes installation, maintenance, and parts information for the Baumann pneumatic actuators.

No person may install, operate or maintain a Baumann actuator without first being trained and qualified in valve, actuator and accessory installation, operation and maintenance, and carefully reading and understanding the contents of this manual. If you have any questions about these instructions, contact your Fisher sales office before proceeding.

DESIGN NOTES

The same basic actuator may be configured in several ways. Variations may produce either a 5/16 in (7.9 mm), 1/2 in (12.7 mm), or 3/4 in (19.1 mm) stroke. The Spring Tables list the nominal bench spring ranges. Each line in the table lists the high and low limits for the signal air pressure, measured in pounds per square inch (psi) and bar. These signal pressures produce the rated stroke lengths when the actuator is not loaded. The signal air connections use 1/4 (6.4 mm) NPT fittings, and are located in both the lower (43) and upper (44) diaphragm cases. Use the lower connection for an "Air-to-Retract" (ATR) actuator and the upper connection for an "Air-to-Extend" (ATE) actuator. The signal air pressure should not exceed 35 psi (2.4 bar). Higher pressures may cause the diaphragm to leak.



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NOTE

Neither Emerson™, Emerson Process Management, Fisher®, nor any of their affiliated entities assumes responsibility for the selection, use, and maintenance of any product. Responsibility for the selection, use, and maintenance of any product remains with the purchaser and end-user.

CAUTION

Often, these types of actuators are attached to valves which include a stainless steel stem and valve seat. When assembling or adjusting the actuators, never turn the valve stem when the plug is touching the valve seat. If the two stainless steel parts rotate while they are touching, they can be damaged very easily.

When adjusting the valve stem (5), do not grip the stem directly with pliers or a wrench. This will damage the surface of the stem, and cause damage to the packing in the valve. Instead, counter-tighten the two locknuts (27) on the stem together. This will allow you to turn the stem by turning the locknuts with a wrench.



WARNING

Always wear protective gloves, clothing, and eye wear when performing any installation operations to avoid personal injury.

Personal injury or equipment damage caused by sudden release of pressure or bursting of pressure retaining parts might result if service conditions exceed those for which the product was intended. To avoid injury or damage, provide relief valve for over pressure protection as required by government or accepted industry codes and good engineering practices.

Check with your process or safety engineer for any additional measures that must be taken to protect against process media.

If installing into an existing application, also refer to the **WARNING** at the beginning of the Maintenance section in this instruction manual.



WARNING

Personal injury or equipment damage caused by sudden release of pressure or bursting of parts may result if the valve assembly is installed where service conditions could exceed the limits given in the product literature, the limits on the appropriate nameplates, or the mating pipe flange rating. Use pressure-relieving devices as required by government or accepted industry codes and good engineering practices. If you cannot determine the ratings and limits for this product, contact your Baumann office or sales representative before proceeding.

Personal injury could result from packing leakage. The packing might require some readjustment to meet specific service conditions.



WARNING

If you move or work on an actuator installed on a valve with loading pressure applied, keep your hands and tools away from the stem travel path to avoid personal injury. Be especially careful when removing the stem connector to release all loading on the actuator stem whether it be from air pressure on the diaphragm or compression in the actuator springs.

Likewise take similar care when adjusting or removing any optional travel stop. Refer to the relevant actuator Maintenance Instructions.

If hoisting the valve take care to prevent people from being injured in case the hoist or rigging slips. Be sure to use adequate sized hoists and chains or slings to handle the valve.

ATTACHING AN AIR-TO-RETRACT (ATR) ACTUATOR TO A VALVE - PART 1

Follow these instructions when assembling the actuator to a valve or other device which provides a positive stop in one direction:

1. Before starting, identify and locate these parts on the valve assembly (Figure 1, page 9): stem locknuts (27), travel indicator (58), bonnet (8), yoke drive nut (9), and plug and stem assembly (4/5). Refer to the assembly instructions for the appropriate Baumann control valve.
2. Place the valve body (1) in a vise. Clamp the flat end faces of the valve. **Do not** clamp the sides of the valve. This may distort the shape of the casting, and ruin the valve.
3. Begin to attach the actuator to the valve body. See figure 1 and figures 2 through 14 depending on actuator type. The yoke drive nut (9) and travel indicator (58) must be removed from the body assembly. The hole at the bottom of the actuator yoke (17) should fit over the top of the valve stem (5). Tilt the top of the actuator back at an angle so you can access the top of the valve stem (5).
4. Position the drive nut (9) over the valve stem (5) with the flat side facing up. (The rounded side should face down, toward the top surface of the yoke.)
5. Thread the two locknuts (27) onto the valve stem (5). Turn both nuts down as far as possible. Lock nuts together using two wrenches to counter-tighten them. By turning the locked nuts with a wrench, you can turn the valve stem without damaging the surface of the stem.
6. Place the travel indicator (58) over the valve stem (5).
7. If applicable, loosen shaft collar (25) (figure 6, page 13) and turn clockwise until it reaches the bottom of the actuator stem (26).
8. Apply anti-seize compound to the first few threads of the valve stem (5). Turn the actuator counter-clockwise to locate the first thread on the stem. Thread stem into actuator a half turn.
9. Apply 15 psi (1 bar) to the signal air port in the lower diaphragm case (43). The bottom of the yoke will drop down and touch the top of the valve bonnet (8).
10. By hand, tighten the drive nut (9).
11. Using a wrench on the counter-tightened nuts (27), turn the stem (5) up until you feel a resistance.
12. Using a hammer and punch, tighten the drive nut (9).
13. Next, make the bench range adjustment. See the next section.

BENCH RANGE ADJUSTMENT AIR-TO-RETRACT (ATR) ACTUATOR

This adjustment sets the valve so that it opens and closes at the correct signal air pressures. On an Air-to-Retract actuator, when the pressure reaches the low end of the range, the valve should just begin to open. Once the bench range has been set correctly, the valve should be completely open when it receives full signal air pressure, and the valve travel should also be correct. The Spring Tables list the possible pressure ranges for different valve configurations. The signal pressure at the low end of the range is dependent on the springs used in the actuator. In order to make this adjustment, you will need an adjustable source of compressed air ranging from 0 to 15 psi (0-1 bar) for types 16 and 32, 0 to 20 psi (0-1.4 bar) for types 54 and 70 with a 1/4 NPT male connector.

1. Connect the air source to the signal air port in the lower diaphragm case (43). Begin at 0 psi (0 bar) and gradually increase the pressure. Notice the pressure at the point when the valve stem (5) just begins to move.
 - If the pressure at this point is too low (lower than the recommended bench initials shown in the Spring Tables), the actuator and stem assembly should be longer. Turn the valve stem (5) out of the actuator stem (26) 1/2 turn.
 - If the pressure at this point is too high, the actuator and stem assembly should be shorter. Turn the valve stem (5) into the actuator stem (26) 1/2 turn.
2. Adjust the length of the valve stem (5) as described above. **Always** turn the valve stem (5) using a wrench on the two counter-tightened nuts (27). Never turn stems while the plug is on the seat.

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CAUTION

Remember that the valve stem (5) cannot be allowed to turn against the valve seat when the two parts are touching. Before you make any adjustment, apply 15 psi (1 bar) to the actuator. This will lift the valve stem away from the seat, and prevent any chance of damage.

3. You may have to repeat steps 1 and 2 several times to get the correct setting.

ATTACHING AN AIR-TO-RETRACT (ATR) ACTUATOR TO A VALVE - PART 2

1. Once the bench range has been adjusted correctly, you can complete the assembly. Apply 15 psi (1 bar) to the signal port on the actuator.
2. Using two wrenches, unlock the two counter-tightened nuts (27). There are flats on the actuator stem (26). Hold these flats with a wrench and, one at a time, turn each nut up as far as possible. Counter-tighten the two nuts together again.
3. Reduce the air pressure to 0 psi (0 bar). Loosen the screws (57) which hold the travel indicator scale (56) in place. Set the scale so the lowest line matches the level of the travel indicator washer.
4. Set the air pressure to the high end of the valve's operating pressure. The travel indicator should move through the full rated travel of 5/16 in, 1/2 in, or 3/4 in (7.9 mm, 12.7 mm, or 19.1 mm).

Note: Shaft collar (25), if applicable, can be set at intermediate positions to provide a minimum opening valve travel stop following calibration.

ATTACHING AN AIR-TO-EXTEND (ATE) ACTUATOR TO A VALVE - PART 1

Follow these instructions when assembling the actuator to a valve or another device which provides a positive stop in one direction. (Type 70 is ATR only)

1. Before starting, identify and locate these parts on the valve assembly, figure 1, page 9: stem locknuts (27), travel indicator (58), bonnet (8), yoke drive nut (9), and plug and stem assembly (4/5). Refer to the assembly instructions for the appropriate Baumann control valve.

2. Place the valve body (1) in a vise. Clamp the flat end faces of the valve. **Do not** clamp the sides of the valve. This may distort the shape of the casting, and ruin the valve.
3. Begin to attach the actuator to the valve body. The yoke drive nut (9) and travel indicator (58) must be removed from the body assembly. The hole at the bottom of the actuator yoke (17) should fit over the top of the valve stem (5). Tilt the top of the actuator back at an angle so you can access the top of the valve stem (5).
4. Position the drive nut (9) over the valve stem (5) with the flat side facing up. (The rounded side should face down, toward the top surface of the yoke.)
5. Thread the two locknuts (27) onto the valve stem (5). Turn both nuts down as far as possible. Lock nuts together using two wrenches to counter-tighten them. By turning the locked nuts with a wrench, you can turn the valve stem without damaging the surface of the stem.
6. Place the travel indicator (58) over the valve stem (5).
7. If applicable, loosen shaft collar (25) (figure 6, page 13) and turn clockwise until it reaches the bottom of the actuator stem (26).
8. Apply anti-seize compound to the first few threads of the valve stem (5). Place actuator over top of valve bonnet (8). Yoke of actuator will make contact with top of bonnet (8). Extend valve stem (5) into actuator stem (26). Turn stem (5) until it comes to a stop, then back off 1/2 turn.
9. By hand, tighten the drive nut (9).
10. Using a wrench on the counter-tightened nuts (27), turn the stem (5) up until you feel a resistance.
11. Using a hammer and punch, tighten the drive nut (9).
12. Next, make the bench range adjustment. See the next section.

BENCH RANGE ADJUSTMENT AIR-TO-EXTEND (ATE) ACTUATOR

This adjustment sets the valve so that it opens and closes at the correct signal air pressures. On an Air-to-Extend actuator, when the pressure reaches the high end of the range, the valve should be completely closed. Once the bench range has been set correctly, the valve should be completely open when it receives

the low reading for the signal air pressure, and the valve travel should also be correct. The Spring Tables list the possible pressure ranges for different valve configurations. The signal pressure at the high end of the range is dependent on the springs used in the actuator. In order to make this adjustment, you will need an adjustable source of compressed air ranging from 0 to 15 psi (0-1 bar) for types 16 and 32, 0 to 20 psi (0-1.4 bar) for types 54 and 70 with a 1/4 NPT male connector.

1. Connect the air source to the signal air port in the upper diaphragm case (44). Gradually increase the pressure toward the high rating listed in appropriate Spring Table. Notice the pressure at the point when the valve is fully seated, and the valve stem (5) stops moving.
 - If the pressure at this point is too high, the actuator and stem assembly should be longer. Turn the valve stem (5) out of the actuator stem (26) 1/2 turn.
 - If the pressure at this point is too low, the actuator and stem assembly should be shorter. Turn the valve stem (5) into the actuator stem (26) 1/2 turn.
2. Adjust the length of the valve stem (5) as described in the last step. Always turn the valve stem (5) using a wrench on the two counter-tightened nuts (27).

CAUTION

Remember that the valve stem (5) cannot be allowed to turn against the valve seat when the two parts are touching. Before you make any adjustment, be certain that there is no air signal to the actuator.

3. You may have to repeat steps 1 and 2 several times to get the correct setting.

ATTACHING AN AIR-TO-EXTEND (ATE) ACTUATOR TO A VALVE - PART 2

1. Once the bench range has been adjusted correctly, you can complete the assembly. Apply 0 psi (0 bar) to the signal port on the actuator.
2. Using two wrenches, unlock the two counter-tightened nuts (27). There are flats on the actuator stem (26). Hold the flats with a wrench and, one at a time, turn each nut up until you feel a resistance. Counter-tighten the two nuts together again.

3. Apply 15 psi (1 bar) to the signal port. Loosen the screws (57) which hold the travel indicator scale (56) in place. Set the scale so the lowest line matches the level of the travel indicator (58).
4. Apply 0 psi (0 bar). The travel indicator (58) should move through the full rated travel of 5/16, 1/2, or 3/4 inches (7.9, 12.7, or 19.1 mm).

SPRING REPLACEMENT, CHANGING BENCH RANGE

The springs inside the actuator can be replaced or changed if necessary. This is necessary if you want to change the “bench range” - the range of pressures over which the actuator is designed to operate. The Spring Tables list the possible spring combinations. To use the tables, identify the stroke and the pressure range for the new valve configuration. This will tell you the part number and the quantity of the springs needed.

Figures 2 and 3 for type 16, figures 4 and 5 for type 32, figures 10 and 11 for type 54, and figure 14 for type 70 show the correct assembly configurations for Air-to-Extend and Air-to-Retract valves. Notice that both types include the same parts, but they are arranged differently. The following sections detail the disassembly and assembly instructions.

FIELD CONVERSION - ATE TO ATR OR ATR TO ATE

Except for the type 70, these actuators can be changed in the field from “Air-to-Extend” (ATE) operation to “Air-to-Retract” operation, or from ATR to ATE operation. If you are making this change without changing the bench range, you can reuse the same parts. The parts are simply assembled in a different way. This is described in more detail in the following sections. The following sections list the disassembly and reassembly instructions.

Notes: Type 70 is available in ATR only.

Field Conversion can not be done on Dual-Stop Actuators.

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WARNING

To avoid personal injury or property damage due to actuator springs being under compression, remove the long cap screws last.

The upper actuator casing may remain fixed to the diaphragm and lower casing during disassembly, even if the casing cap screw have been loosened. If this happens, the actuator springs are still under compression. The upper casing could suddenly come loose and jump, due to the compressed energy of the springs. If the upper casing is stuck to the diaphragm and lower casing when you begin loosening the casing cap screws, pry the casings apart with a prying tool. Always be sure that the springs are dispersing energy and the upper casing is moving against the long bolts during disassembly.



WARNING

To avoid personal injury or property damage by uncontrolled movement of the actuator yoke, loosen the body/yoke nuts or bonnet/yoke nuts by following the instructions in the next step. Do not remove a stuck actuator by pulling on it with equipment that can stretch or store energy in any other manner. The sudden release of stored energy can cause uncontrolled movement of the actuator yoke.

REMOVING THE ACTUATOR FROM THE VALVE

1. For an Air-To-Retract (ATR) Actuator

Apply 15 psi (1 bar) for type 16 and 32, 20 psi (1.4 bar) for type 54 and 70, to the signal air inlet located in the lower diaphragm case (43). This will lift the plug and stem (4/5) away from the valve seat.

For an Air-to-Extend (ATE) Actuator

Disconnect the signal air line connected to the upper diaphragm case (44). This will assure that the actuator is vented and that the valve plug and stem (4/5) are fully lifted away from the valve seat.

2. For both types

Place a wrench on the flats of the actuator stem. With an additional wrench, engage the upper locknut (27) on the stem and back out the stem about 1/4" (6.4 mm). (This procedure will prevent the actuator stem from turning and causing damage to the diaphragm).

3. Loosen the yoke drive nut (9).
4. Using the wrench to work against one of the counter-tightened nuts, turn the valve stem (5) completely down until the end unthreads from the actuator stem (26).
5. Remove the travel indicator (58) from the valve stem (5). Loosen the locknuts (27) and remove them. Remove the yoke drive nut (9).
6. Lift the actuator assembly off of the valve bonnet (8).

DISASSEMBLING THE ACTUATOR

1. Remove the actuator from the valve as described earlier.
2. Remove the cap screws (45) and nuts (46). Loosen the nuts from the cap screws gradually and evenly. Some units may have a combination of longer and shorter screws. After removing the shorter screws, the remaining longer screws must be loosened evenly. The springs put a lot of force on the diaphragm cases (43/44). It is important to release the spring tension gradually before you try to open them.
3. Remove the upper diaphragm case (44) and note the position of the parts inside. For the type 70 the upper diaphragm plate (40) must also be removed.
4. Except for the type 16, lift out the actuator stem (26) with the diaphragm plate (40) and the diaphragm (39). For the type 16, loosen locknut (30) remove stem (26) through the bottom.
5. For type 32, 54, and 70 the lower part of the actuator stem (26) has flats. Use these flats to clamp the lower end of the stem into a vise. Unscrew the Nyloc® nut (30). On an ATE unit, remove the washer (112)(Key 116 for the 54 actuator), diaphragm (39), diaphragm plate (40), and for the 32 actuator, stop cup (79). NOTE: There is not a stop cup for the type 16 actuator. (An ATR unit has the same parts, but they are attached in a different order.)

6. Replace the diaphragm (39) and the o-ring(s) (50) if these parts are damaged.

REASSEMBLING THE ACTUATOR - ATE TYPE

1. Use the flats on the actuator stem (26) to grip the lower end of the stem in a vise.
2. For the 32 actuator, place the stop cup (79) in position on the upper end of the stem. On an ATE actuator, the stop cup faces down.
3. Place the diaphragm plate (40) on the upper end of the stem (26), also facing down.
4. Place the diaphragm (39) in position. The curved part of the diaphragm should open downward.
5. Place the washer (112)(Key 116 for the 54 actuator) over the opening in the diaphragm plate.
6. Thread the Nyloc® nut (30) onto the end of the stem (26) and tighten it.
7. Turn the assembly upside-down, and grip the Nyloc® nut (30) in the vise.
8. Place the springs (22) on the diaphragm plate (40). Each spring should be centered on one of the raised “bosses” on the plate.
9. Slide the stop collar (115) over the free end of the actuator stem (26).
10. Check to see that the o-ring (50) is in position on the actuator stem (26).
11. Apply some light grease to the o-ring (50) and to the surface of the actuator stem (26).
12. Slide the lower diaphragm case (43), with the actuator yoke (17) attached, over the actuator stem (26). Make sure that the outer bolt holes of the lower diaphragm case (43) line up with the holes in the diaphragm (39). If there is interference with any of the springs, rotate the case into another position.
13. Remove the assembly from the vise. Press in on the diaphragm assembly a bit to compress the springs. Flip over the assembly and reattach the upper diaphragm case (44). As you do this, be sure that all of the springs are upright, and none of them are sitting on one of the bolt heads. Insert the cap screws (45) and tighten the nuts (46). It may be necessary to compress the springs slightly to start the nuts. Tighten the nuts evenly, and cross from one side of the assembly to the other as you tighten. This will guarantee that the spring tension is taken up evenly.

14. Apply air pressure to the actuator and check for friction or leakage. The actuator should travel smoothly through the entire travel range. Apply leak detection fluid to the area around the guide bushing (54). Also check for leaks around the outer edge of the diaphragm (39).
15. Make the adjustments described in the section on “Bench Range Adjustment - Air-to-Extend (ATE) Valve.”

REASSEMBLING THE ACTUATOR - ATR TYPE

1. Use the flats on the actuator stem (26) to grip this part in a vise.
2. Place the washer (112)(Key 116 for the 54 actuator) over the threaded part of the actuator stem (26).
3. Place the diaphragm (39) in position. The curved part of the diaphragm should open upward.
4. Place the diaphragm plate (40) on the upper end of the stem (26), also facing up.
5. For the 32 actuator, place the stop cup (79) in position on the upper end of the stem (26). On an ATR actuator, the stop cup faces up.
6. Thread the Nyloc® nut (30) onto the end of the stem (26) and tighten it.
7. Slide the stop collar (115) over the free end of the actuator stem (26).
8. Check to see that the o-ring (50) is in position on the actuator stem (26).
9. Apply some light grease to the o-ring (50), and to the surface of the actuator stem (26).
10. Slide the actuator stem into the lower diaphragm case (43). Turn the assembly so the holes in the diaphragm (39) line up with the holes in the diaphragm case (43).
11. Place the springs (22) on the diaphragm plate (40). Each spring should be centered on one of the raised “bosses” on the plate.
12. Reattach the upper diaphragm case (44). As you do this, be sure that each of the springs is upright. Insert the cap screws (45) and tighten the nuts (46). It may be necessary to press down on the upper diaphragm case (44) a bit to compress the springs slightly and start the nuts. Tighten the nuts evenly, and cross from one side of the assembly to the other as you tighten. This will guarantee that the spring tension is taken up evenly.

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WARNING

To avoid personal injury or equipment damage due to possible sudden shifting or falling of the valve assembly, do not lift the valve assembly by the handwheel.

13. Apply air pressure to the actuator and check for friction or leakage. The actuator should travel smoothly through the entire travel range. Apply leak detection fluid to the area around the guide bushing (54). Also check for leaks around the outer edge of the diaphragm.
14. Make the adjustments described in the section on "Bench Range Adjustment-Air-to-Retract (ATR) Valve."

ACTUATOR MAINTENANCE

A routine maintenance schedule might call for regular replacement of the o-ring(s) (50) or the diaphragm (39). Follow the disassembly and reassembly instructions listed earlier.

HANDWHEEL OPERATION

For air-to-retract actuators, turn handwheel clockwise to manually retract stem and counterclockwise to extend stem. The small locking knob on top of the handwheel assembly enables the user to lock the desired handwheel position.

For air-to-extend actuator, turn handwheel clockwise to manually extend stem and counterclockwise to retract stem. The lever on the handwheel stem enables the user to lock the desired handwheel position.

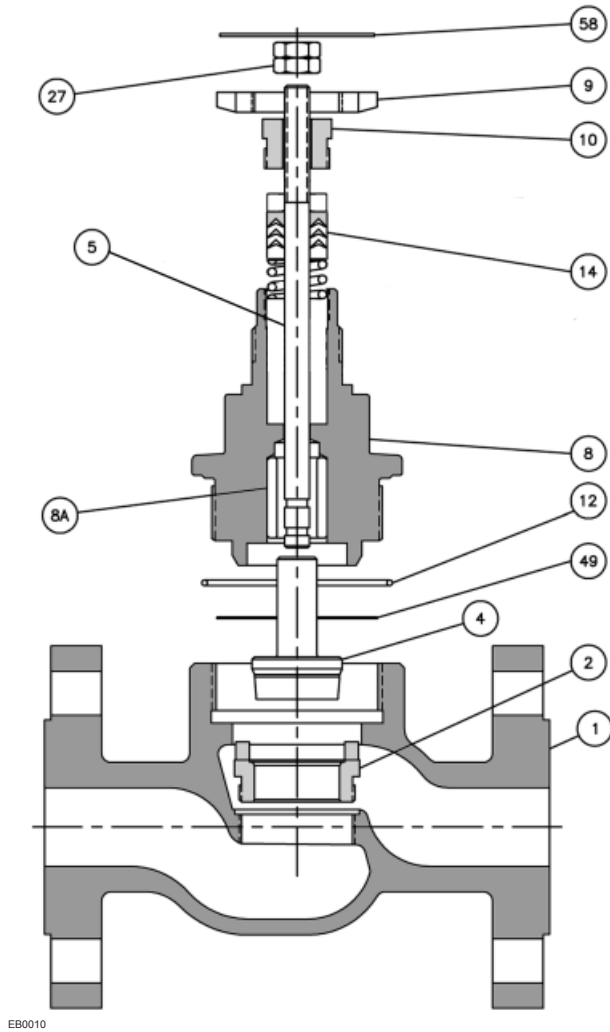
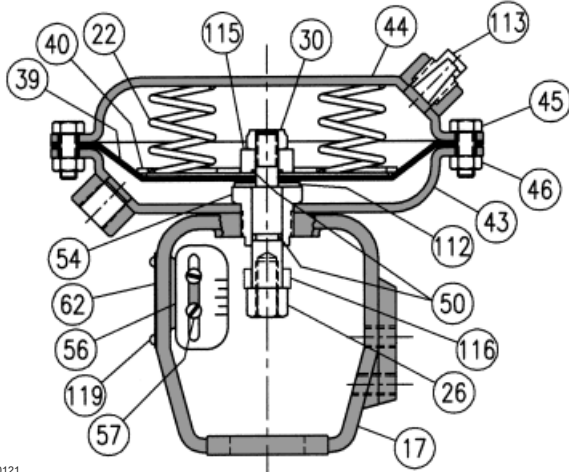


Table 1. COMMON VALVE PARTS

KEY NO.	DESCRIPTION
1	Body
2	Seat Ring
4	Plug
5	Stem
8	Bonnet
8A	Bonnet Bushing
9	Drive Nut
10	Packing Follower
12	O-Ring
14	Packing
27	Locknuts
49	Body Gasket
58	Travel Indicator

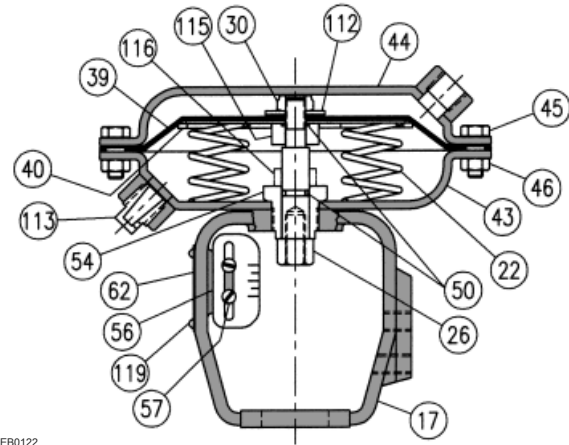
Figure 1. Typical Valve Components

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EB0121

Figure 2. Type 16 Actuator, Air-to-Retract (ATR)



EB0122

Figure 3. Type 16 Actuator, Air-to-Extend (ATE)

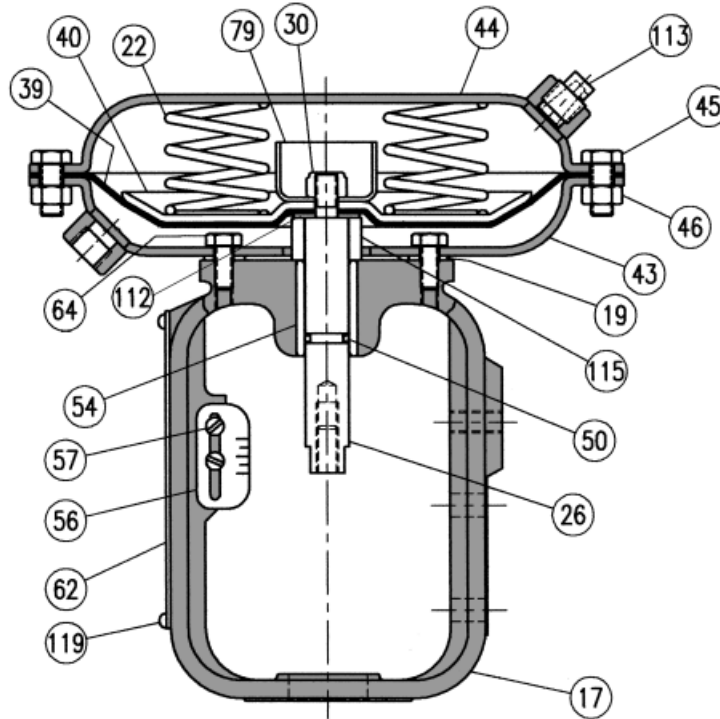
Table 2. TYPE 16 ACTUATOR COMMON PARTS

KEY NO.	DESCRIPTION	PART NUMBER	QTY
17	Actuator yoke	81811	1
22*	Spring	See Table 3	See Table 3
26	Actuator Stem	81840	1
30	Nut, Self-Locking	81844	1
39*	Diaphragm	011759-001-686	1
40	Diaphragm Plate	81850-1	1
43	Diaphragm Case, Lower	81820	1
44	Diaphragm Case, Upper	81823	1
45	Hex Head Cap Screw	81824	8
46	Nut, Hex	81825	8
50*	O-Ring (FKM (Fluorocarbon))	24080	2
54	Coupling	81830	1
56	Travel Scale, 0.5 inch	983674-001-250	1
	Travel Scale, 0.3125	87935	
57	Screw	81812	2
62	Serial Plate	81891	1
112	Washer	25861-24	1
113	Vent Plug	24147	1
115	Collar	81870	1
116	Collar (0.3125 inch travel only)	81842	1
119	Drive Screw	24686	2

*Recommended Spare Parts

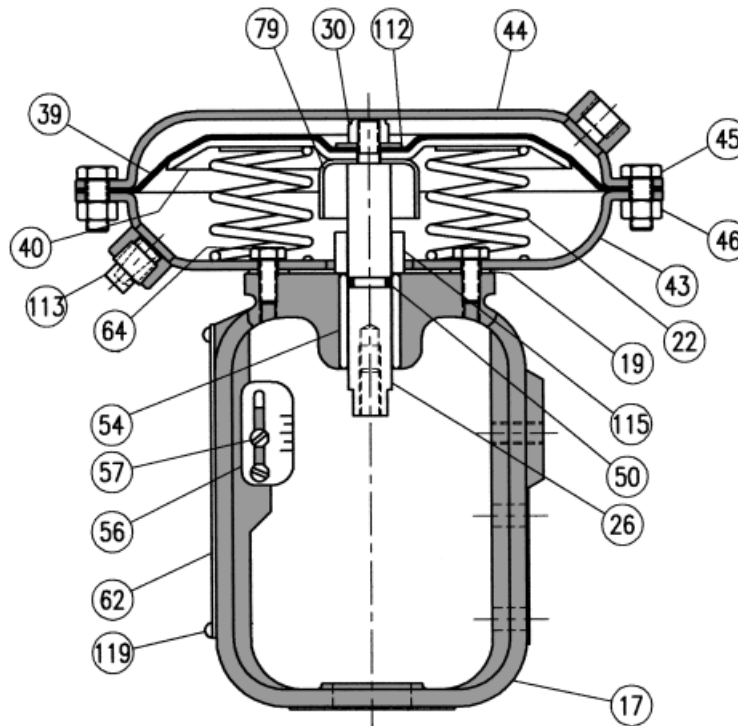
Table 3. TYPE 16 ACTUATOR SPRING RANGES

ACTION	TRAVEL		NOMINAL BENCH SPRING RANGE		SPRING PART NO. (KEY 22)	QTY	COLLAR (KEY 116)	QTY
	in	mm	psi	bar				
ATE (ATC)	0.5	12.7	3-13	0.2-0.9	81860	4	---	---
	0.3125	7.9	4-13	0.3-0.9	81864	4	81842	1
ATR (ATO)	0.5	12.7	3-15	0.2-1.0	81860	5	---	---
	0.3125	7.9	4-15	0.3-1.0	81863	4	81842	1



EB0123

Figure 4. Type 32 Actuator, Air-to-Retract (ATR)



EB0124

Figure 5. Type 32 Actuator, Air-to-Extend (ATE)

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Table 4. TYPE 32 ACTUATOR COMMON PARTS

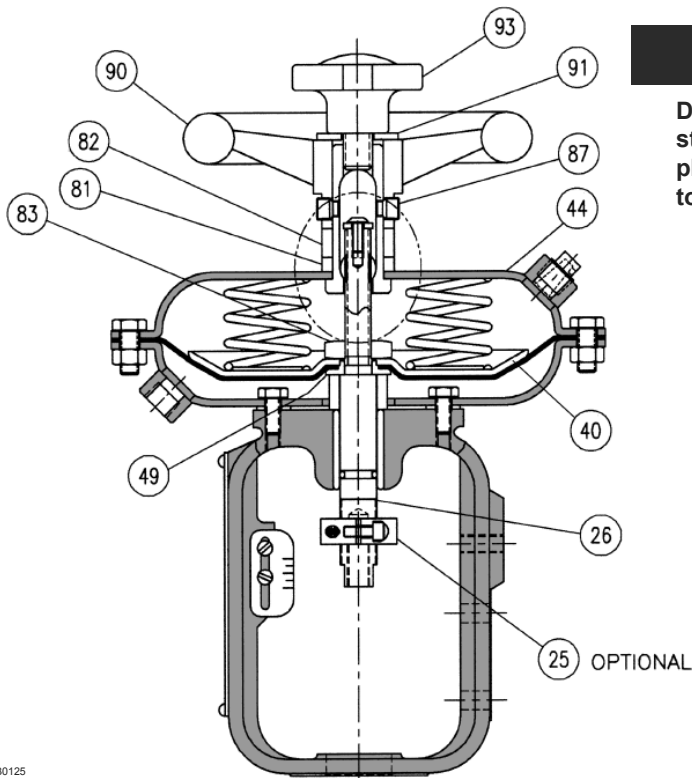
KEY NO.	DESCRIPTION	TYPE 32 ACTUATOR			
		0.5 in TRAVEL (12.7 mm)		0.75 in TRAVEL (19.1 mm)	
		PART NO.	QTY	PART NO.	QTY
17/54	Yoke w / guide bushing	24184-10	1	24184-10	1
	Yoke (for Fisher® valves) w / guide bushing	24184-1-1		24184-1-1	
19	Gasket (standard)	009191-445-883	1	009191-445-883	1
	Gasket (Hi-Temperature)	009191-445-885		009191-445-885	
22	Actuator Spring	See Table 5	---	See Table 5	---
26	Actuator Stem, 5/16 thread	24613	1	24613	1
	Actuator Stem (for Fisher valves), 3/8 thread	24613-2		24613-2	
30 (B)	Nut, Nyloc	See Key No. 39A			
39 (B)	Diaphragm	See Key No. 39A			
39A (A)(B)	Diaphragm Kit (standard)	24462	1	24462	1
	Diaphragm Kit (Hi-Temperature)	24464	1	24464	1
40	Diaphragm Plate	24811	1	24811	1
43	Diaphragm Case (Lower)	011767-004-999	1	011767-004-999	1
44	Diaphragm Case (Upper)	011766-001-999	1	011766-001-999	1
45	Cap Screw	25913-1	8	25913-1	8
46	Nut	971511-011-250	8	971511-011-250	8
50 (B)	O-Ring (FKM (Fluorocarbon))	See Key No. 39A			
56	Travel Indicator Scale	983674-001-250	1	983674-003-250	1
57	Machine Screw	971302-003-250	2	971302-003-250	2
62	Serial Plate	983753-001-600	1	983753-001-600	1
64	Cap Screw	971000-007-1	6	971000-007-1	6
79	Stop Cup	See Table 5	---	See Table 5	---
112	Washer	25861-24	1	25861-24	1
113	Vent Plug	24147	1	24147	1
115	Stop Collar	24187	1	24187	1
119	Drive Screw	24686	2	24686	2

NOTES: A. Recommended Spare Parts

B. Diaphragm Kit (39A) includes Locknut (30), O-Ring (50), and Diaphragm (39). These parts are not sold separately.

Table 5. TYPE 32 ACTUATOR SPRING RANGES

ACTION	TRAVEL		NOMINAL BENCH SPRING RANGE		SPRING PART NO. (KEY 22)	QTY	STOP CUP (KEY 79)	QTY
	in	mm	psi	bar				
ATE (ATC)	0.5	12.7	3-9	0.2-0.6	24820	4	24116	1
			3-10	0.2-0.7	24821	6	24116	1
			3-13	0.2-0.9	24820	6	24116	1
	0.75	19.1	3-10	0.2-0.7	24821	4	24830	1
			3-13	0.2-0.9	24821	6	24830	1
ATR (ATO)	0.5	12.7	3-9	0.2-0.7	24820	4	24116	1
			5-15	0.3-1.0	24820	6	24116	1
			7-15	0.5-1.0	24821	6	24830-1	1
	0.75	19.1	3-9	0.2-0.7	24821	4	24830	1
			5-15	0.3-1.0	24827	6	24830	1

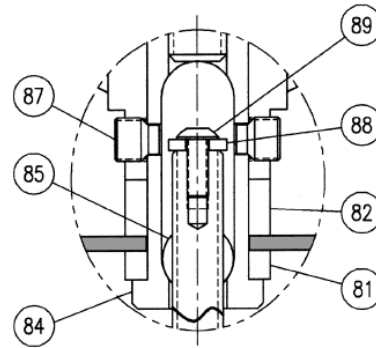


EB0125

Figure 6. Type 32 Actuator with Handwheel and Optional Dual Stop, Air-to-Retract, (ATR)

CAUTION

Do not continue to turn handwheel after the stem is fully extended (valve fully closed and plug seated) or fully retracted (valve fully open) to avoid damage to the handwheel assembly.



5-15 PSI, 1/2" TRAVEL
NOTE POSITION OF KEY
NUMBERS 81 & 82

Table 6. TYPE 32 ATR WITH HANDWHEEL AND DUAL STOP

KEY NO.	DESCRIPTION	PART NO.	QTY
25	Shaft Collar (optional)	24732-2	1
26	Actuator Stem, 5/16 thread	24613-4	1
	Actuator Stem (for Fisher® valves), 3/8 thread	24613-3	1
	Actuator Stem (for optional dual stop collar)	24613-16	1
39A (A)(B)	Diaphragm Kit (standard)	24462-2	1
	Diaphragm Kit (Hi-Temperature)	24464-2	1
40	Diaphragm Plate	24811-1	1
44	Diaphragm Case (Upper)	011766-012-999	1
49	Spacer	24726	1
81	Spacer	24855-1	1
82	Spacer	24855	1
83	Nut	24602-1	1
84	Clevis	24603-1	1
85	Nut, Round Bronze	24604	1
87	Screw, Set Socket	24606	2
88	Washer, Flat	24620	1
89	Screw, Socket Head	24619	1
90	Handwheel	24605	1
91	Washer, Flat	25958	1
93	Locking Knob	24607	1

NOTES: A. Recommended Spare Parts

B. Diaphragm Kit (39A) includes O-Ring (50) and Diaphragm (39). These parts are not sold separately.

CAUTION

Do not continue to turn handwheel after the stem is fully extended (valve fully closed and plug seated) or fully retracted (valve fully open) to avoid damage to the handwheel assembly.

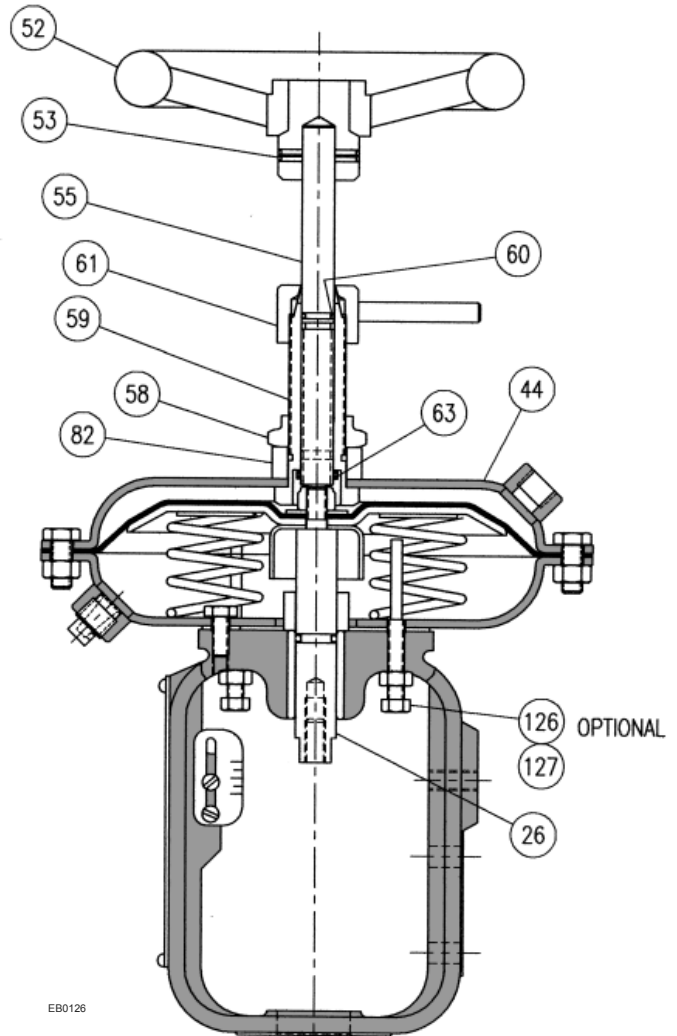
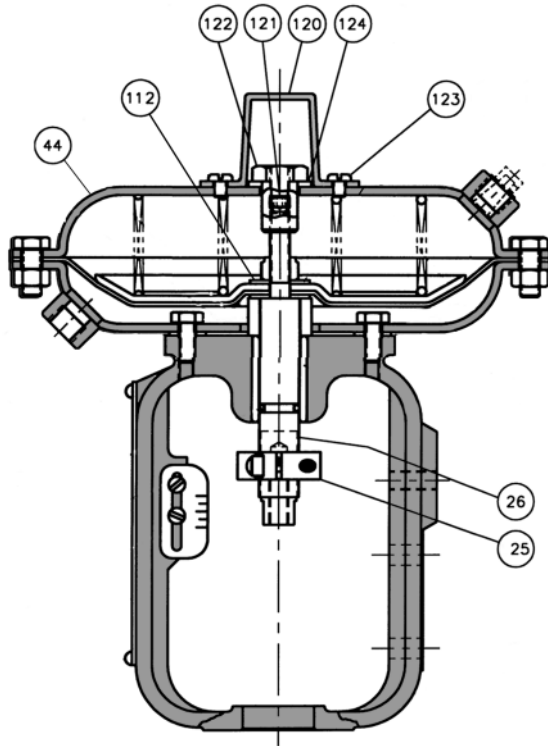


Figure 7. Type 32 Actuator with Handwheel and Optional Dual Stop, Air-to-Extend, (ATE)

Table 7. TYPE 32 ATE WITH HANDWHEEL AND DUAL STOP

KEY NO.	DESCRIPTION	PART NO.	QTY
26	Actuator Stem, 5/16 thread	24613-4	1
	Actuator Stem (for Fisher® valves), 3/8 thread	24613-2	
44	Diaphragm Case (Upper)	011766-012-999	1
52	Handwheel, P/N 25977	Kit Part No. 25985	1
53	Roll Pin, P/N 25897		
55	Stem, Handwheel, P/N 25976		
58	Nut, Self-Locking		
59	Adapter, Handwheel	25978-2	1
60	O-Ring	25926	1
61	Lock-Nut	25979	1
63	Spring Pin	24835	1
82	Bushing, Handwheel	24834	1
126	Hex Bolt (0.5 in travel)	24756-6	2
	Hex Bolt (0.75 in travel)	24756-7	
127	Hex Nut	971511-010-250	2

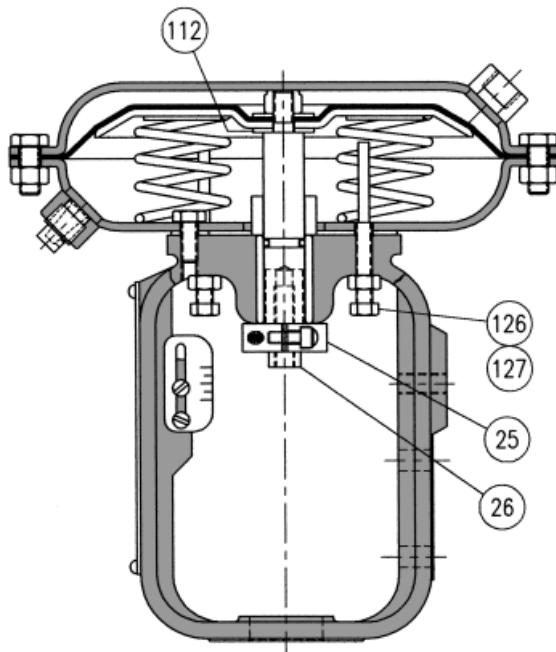


EB0127

Figure 8. Type 32 Actuator with Dual Stop Air-to-Retract (ATR)

Table 8. TYPE 32 ACTUATOR WITH DUAL STOP (ATR) PARTS

KEY NO.	DESCRIPTION	PART NO.	QTY
25	Shaft Collar	24732-2	1
26	Actuator Stem, 5/16 thread	24732-1	1
	Actuator Stem (for Fisher® valves), 3/8 thread	24732-6	
44	Diaphragm Case (Upper)	24132	1
112	Washer	25861-24	1
120	Travel Stop Cover	24128	1
121	Set Screw	24126	1
122	Travel Stop	24129	1
123	Screw	24128-1	2
124	Bottom Ring	25602	1

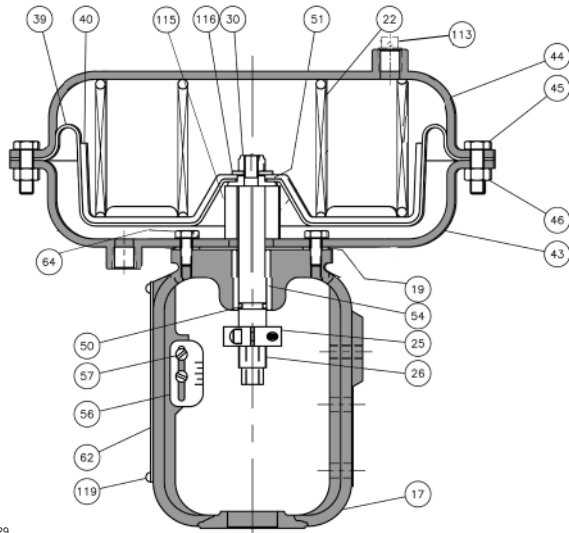


EB0128

Figure 9. Type 32 Actuator with Dual Stop Air-to-Extend (ATE)

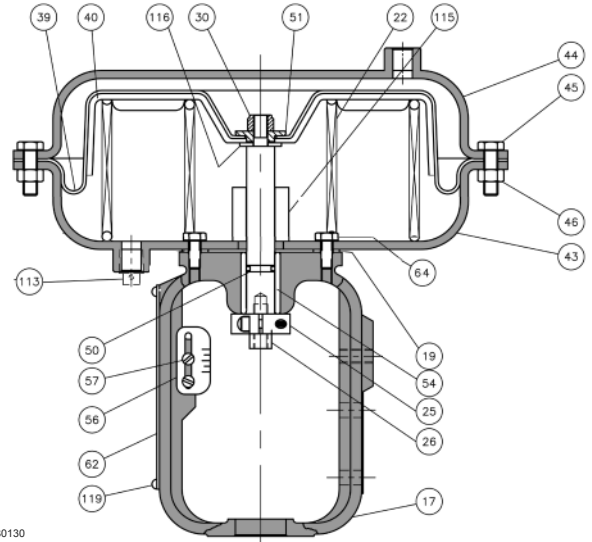
Table 9. TYPE 32 ACTUATOR WITH DUAL STOP (ATE) PARTS

KEY NO.	DESCRIPTION	PART NO.	QTY
25	Shaft Collar	24732-2	1
26	Actuator Stem, 5/16 thread	24613-15	1
	Actuator Stem (for Fisher® valves), 3/8 thread	24613-20	
112	Washer	25861-24	2
126	Hex Bolt, (0.5 in travel)	24756-6	2
	Hex Bolt, (0.75 in travel)	24756-7	
127	Hex Nut	971511-010-250	2



EB0129

Figure 10. Type 54 Actuator Air-to-Retract (ATR)



EB0130

Figure 11. Type 54 Actuator Air-to-Extend (ATE)

Table 10. TYPE 54 ACTUATOR COMMON PARTS

KEY NO.	DESCRIPTION	TYPE 54 ACTUATOR			
		0.5 in TRAVEL (12.7 mm)		0.75 in TRAVEL (19.1 mm)	
		PART NO.	QTY	PART NO.	QTY
17/54	Yoke w / guide bushing	24184-10	1	24184-10	1
	Yoke (for Fisher® valves) w / guide bushing	24184-1-1		24184-1-1	
19	Gasket (standard)	009191-445-883	1	009191-445-883	1
	Gasket (Hi-Temperature)	009191-445-885		009191-445-885	
22	Actuator Spring	See Table 11	---	See Table 11	---
25	Shaft Collar	24732-2	1	24732-2	1
26	Actuator Stem, 5/16 thread	24295-2	1	24295-2	1
	Actuator Stem, 3/8 thread	24295-3		24295-3	
30(B)	Nyloc Nut	See Key No. 39A			
39(B)	Diaphragm	See Key No. 39A			
39A (A)(B)	Diaphragm Kit (standard)	24463	1	24463	1
	Diaphragm Kit (Hi-Temperature)	24465	1	24465	1
40	Diaphragm Plate	0.330-0420	1	0.330.0420	1
43	Diaphragm Case (Lower)	24294	1	24294	1
44	Diaphragm Case (Upper)	25989	1	25989	1
45	Cap Screw	See Table 11	---	See Table 11	---
46 (A)	Nut	971511-011-250	8	971511-011-250	8
50 (B)	O-Ring (FKM (Fluorocarbon))	See Key No. 39A			
51	Spacer	24724	1	24724	1
56	Travel Indicator Scale	983674-001-250	1	983674-003-250	1
57	Machine Screw	971302-003-250	2	971302-003-250	2
62	Serial Plate	983753-001-600	1	983753-001-600	1
64	Hex Head Cap Screw	971000-007-1	6	971000-007-1	6
113	Vent Plug	24147	1	24147	1
115	Stop Collar (C)	24297-1	1	24297-1	1
116	Washer	25861-24	1	25861-24	1
119	Drive Screw	24686	2	24686	2

NOTES: A. Recommended Spare Parts

B. Diaphragm Kit (39A) includes Locknut (30), O-Ring (50), and Diaphragm (39). These parts are not sold separately.

C. See Table 12, page 18 for Stop Collar for Sanitary Valve.

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Table 11. TYPE 54 ACTUATOR SPRING RANGES - NON-SANITARY

ACTION	TRAVEL		NOMINAL BENCH SPRING RANGE		SPRING PART NO. (KEY 22)	QTY	CAP SCREWS (KEY 45)		CAP SCREW COVERS	QTY		
	in	mm	psi	bar								
ATE (ATC)	0.50	12.7	3-10	0.2-0.7	24906	4	24783	2	24900	2		
							25913-1	6				
			3-13	0.2-0.9	24906	6	24783	2	24900	2		
							25913-1	6				
	0.75	19.1	3-10	0.2-0.7	25915	4	24783	2	24900	2		
							25913-1	6				
		3-13	0.2-0.9	25915	6	24783	2	24900	2			
						25913-1	6					
ATR (ATO)	0.50	12.7	3-10	0.2-0.7	24906	4	24783	2	24900	2		
							25913-1	6				
					5-15	0.3-1.0	24906	6	24783	2	24900	2
									25913-1	6		
					6-14	0.4-1.0	25915	6	24783	2	24900	2
									25913-1	6		
					7-13	0.5-0.9	25915	6	24783	2	24900	2
									25913-1	6		
					7-15	0.5-1.0	25915	6	24783	2	24900	2
									25913-1	6		
			8-15	0.6-1.0	25915	6	24783	2	24900	2		
							25913-1	6				
			9-15	0.6-1.0	21819	4	24783	2	24900	2		
							25913-1	6				
			10-16	0.7-1.1	25940	6	24783	2	24900	2		
							25913-1	6				
			11-15	0.8-1.0	24654	6	24783	2	24900	2		
							25913-1	6				
			12-16	0.8-1.1	24654	6	24783	2	24900	2		
							25913-1	6				
	0.75	19.1	3-10	0.2-0.7	25915	4	24783	2	24900	2		
								25913-1			6	
				3-14	0.2-1.0	24906	4	24783	2	24900	2	
								25913-1	6			
				4-16	0.2-1.1	24906	4	24783	2	24900	2	
								25913-1	6			
				5-15	0.3-1.0	25915	6	24783	2	24900	2	
								25913-1	6			
				6-16	0.4-1.1	25915	6	24783	2	24900	2	
								25913-1	6			
		7-13	0.5-0.9	25940	4	24783	2	24900	2			
						25913-1	6					
		8-14	0.6-1.0	21819	3	24783	2	24900	2			
						25913-1	6					
		9-17	0.6-1.2	21819	4	24783	2	24900	2			
						25913-1	6					
		10-14	0.7-1.0	41825	6	24783	2	24900	2			
						25913-1	6					
		11-16	0.8-1.1	24654	6	24783	2	24900	2			
						25913-1	6					

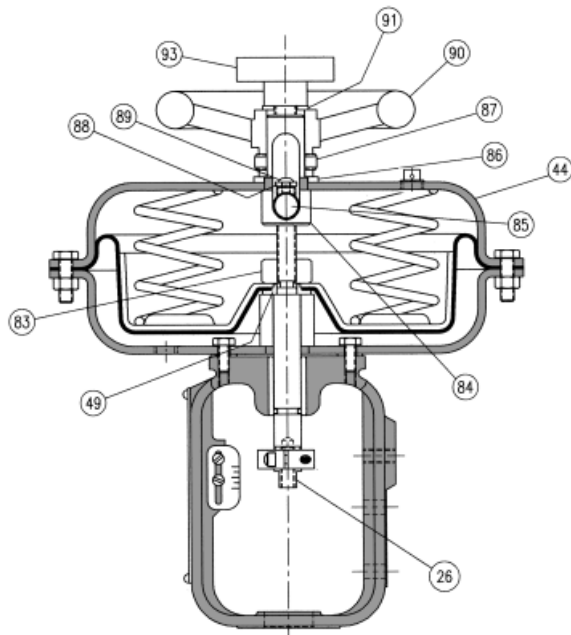
Pneumatic Actuators

Table 12. TYPE 54 ACTUATOR SPRING RANGES - SANITARY

ACTION	TRAVEL		NOMINAL BENCH SPRING RANGE		SPRING PART NO. (KEY 22)	QTY	CAP SCREWS (KEY 45)		CAP SCREW COVERS	QTY	STOP COLLAR (KEY 115)	QTY
	in	mm	psi	bar								
ATE (ATC)	0.50	12.7	3-10	0.2-0.7	24906	4	24783	2	24900	2	24907	1
							25913-1	6				
			3-13	0.2-0.9	24906	6	24783	2	24900	2	24907	1
							25913-1	6				
	0.75	19.1	3-10	0.2-0.7	25915	4	24783	2	24900	2	24297	1
							25913-1	6				
		3-13	0.2-0.9	25915	6	24783	2	24900	2	24333 & 24187	1	
						25913-1	6				2	
ATR (ATO)	0.50	12.7	5-15	0.3-1.0	24906	6	24783	2	24900	2	24297	1
							25913-1	6				
			8-15	0.6-1.0	25915	6	24783	2	24900	2	24670 (machined to 1.54" length)	1
							25913-1	6				2
	0.75	19.1	5-15	0.3-1.0	25915	6	24783	2	24900	2	24297	1
							25913-1	6				
			7-13	0.5-0.9	25940	4	24783	2	24900	2	24333 & 24187	1
8-14	0.6-1.0	21819	3	24783	2	24900	2	24670-2 (machined to 1.50" length)	1			
											25913-1	6

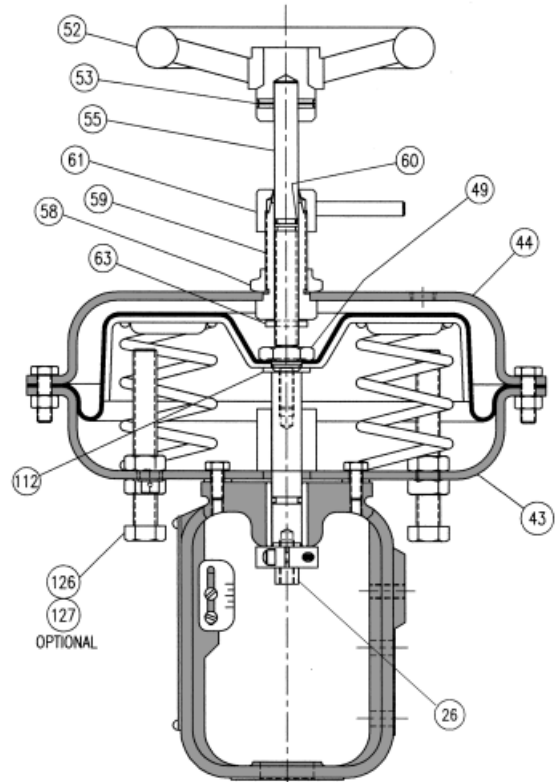
CAUTION

Do not continue to turn handwheel after the stem is fully extended (valve fully closed and plug seated) or fully retracted (valve fully open) to avoid damage to the handwheel assembly.



EB0131

Figure 12. Type 54 Actuator, Air-to-Retract (ATR) with Handwheel



EB0132

Figure 13. Type 54 Actuator, Air-to-Extend (ATE) with Handwheel

Table 13.

TYPE 54 ACTUATOR ATR WITH HANDWHEEL PARTS*

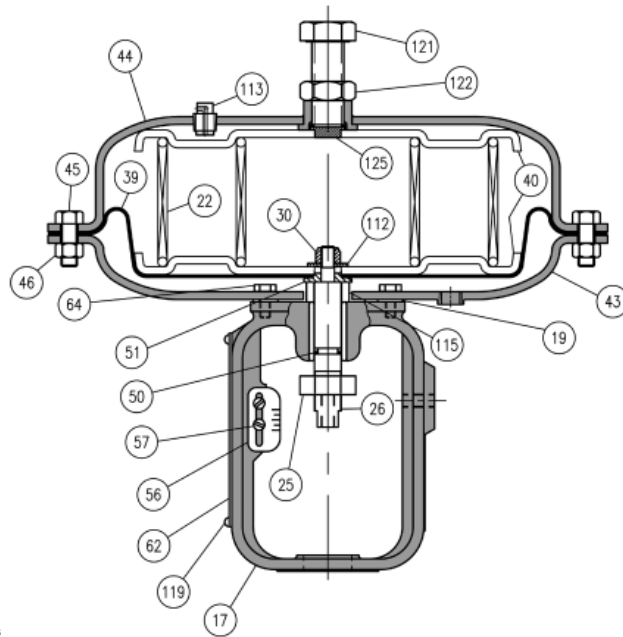
KEY NO.	DESCRIPTION	PART NO.	QTY
26	Actuator Stem, 5/16 thread	24601	1
	Actuator Stem, 3/8 thread	24601-2	
44	Diaphragm Case (Upper)	24608	1
49	Spacer	24726	1
83	Nut	24602-1	1
84	Clevis	24603	1
85	Nut, Round Bronze	24604	1
86	Washer	25613	1
87	Screw, Set Socket	24606	2
88	Washer, Flat	24620	1
89	Screw, Socket Head	24619	1
90	Handwheel	24605	1
91	Washer, Flat	25958	1
93	Locking Knob	24607	1

*Standard construction furnishes up and down travel stops.

Table 14.

TYPE 54 ACTUATOR ATE WITH HANDWHEEL PARTS

KEY NO.	DESCRIPTION	PART NO.	QTY
26	Actuator Stem, 5/16 thread	24295	1
	Actuator Stem, 3/8 thread	24295-1	
43	Diaphragm Case (Lower)	24294	1
44	Diaphragm Case (Upper)	24608	1
49	Head Bolt	25987	1
52	Handwheel	Kit No. 25985	1
53	Roll Pin		
55	Stem, Handwheel		
58	Nut, Self-Locking	25924	1
59	Adapter	25978	1
60	O-Ring	25926	1
61	Lock-nut	25979	1
63	Roll Pin	25931	1
112	Washer	25918	1
126	Hex Tap Bolt (for dual stop only)	24756-8	3
127	Hex Jam Nut (for dual stop only)	42789	3



EB0133

Figure 14. Type 70 Actuator

Table 15. TYPE 70 ACTUATOR PARTS

KEY NO.	DESCRIPTION	PART NO.	QTY
17/54	Yoke w / guide bushing	24184-10	1
	Yoke (for Fisher® valves) w / guide bushing	24184-1-1	
19	Gasket (standard)	009191-445-883	1
	Gasket (Hi-Temperature)	009191-445-885	
22	Actuator Spring	See Table 16	---
25	Shaft Collar	24732-2	1
26	Actuator Stem, 5/16 thread	24330-2	1
	Actuator Stem, 3/8 thread	24330-3	
30 (B)	Nyloc, Nut	See Key No. 39A	
39 (B)	Diaphragm	See Key No.39A	
39A (A)(B)	Diaphragm Kit (standard)	24471	1
40	Diaphragm Plate	24350	2
43	Diaphragm Case (Lower)	24310	1
44	Diaphragm Case (Upper)	24317	1
45	Cap Screw (short)	See Table 16	---
46	Nut	24705M	16
50 (B)	O-Ring (FKM (Fluorocarbon))	See Key No. 39A	
51	Spacer	24724	1
56	Travel Indicator Scale (0.5 in travel)	983674-001-250	1
	Travel Indicator Scale (0.75 in travel)	983674-003-250	
57	Machine Screw	971302-003-250	2
62	Serial Plate	983753-001-600	1
64	Cap Screw	971000-007-1	6
112	Washer	25861-24	2
113	Vent Plug	24147	1
115	Stop Collar	24333	1
119	Drive Screw	24686	2
121	Set Screw	24332-1	1
122	Jam Nut	24334	1
125	Adjustment Screw Seat	24331	1

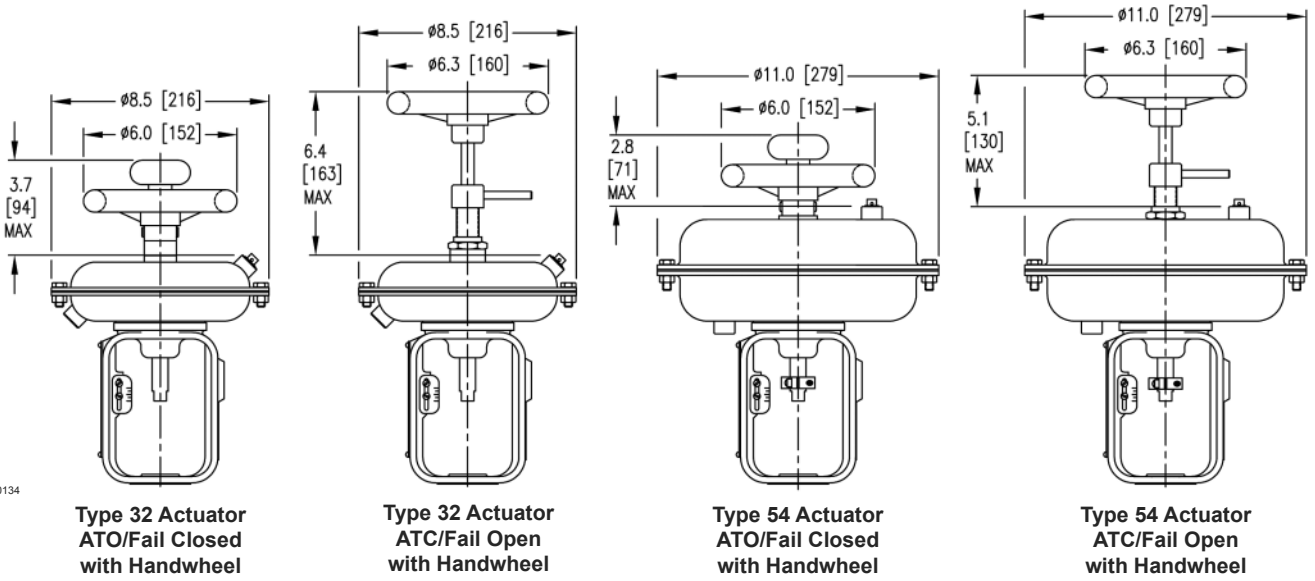
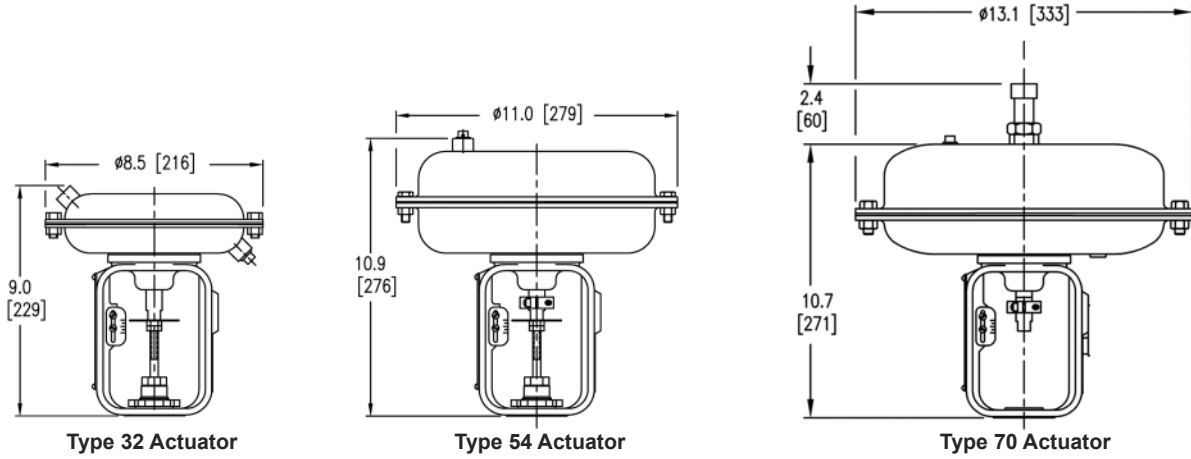
NOTES: A. Recommended Spare Parts

B. Diaphragm Kit (39A) includes Locknut (30), O-Ring (50), and Diaphragm (39). These parts are not sold separately.

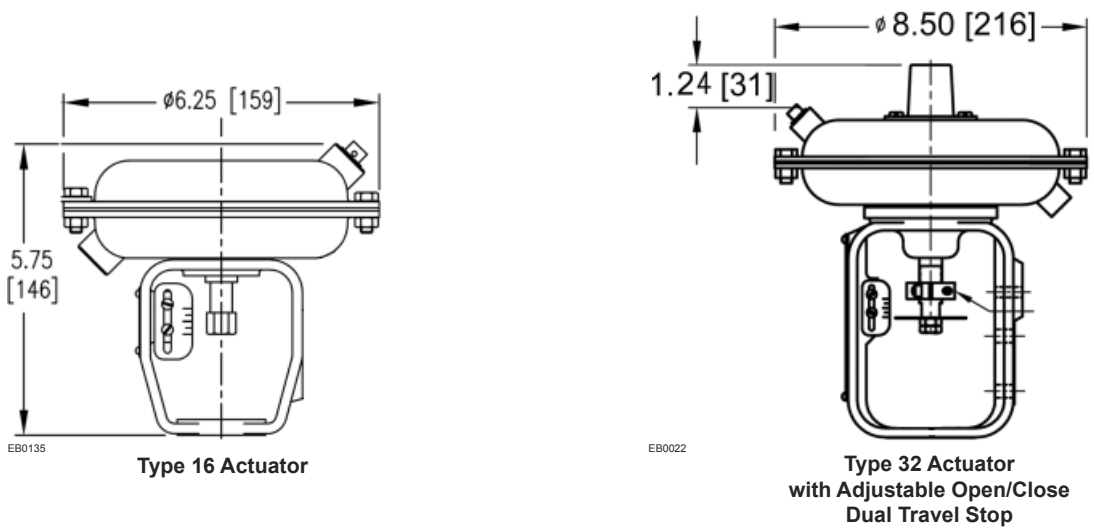
Table 16. TYPE 70 SPRING RANGES

ACTION	TRAVEL		NOMINAL BENCH SPRING RANGE		SPRING PART NO. (KEY 22)	QTY	CAP SCREWS (KEY 45)	QTY	CAP SCREW COVERS	QTY		
	in	mm	psi	bar								
ATR (ATO)	0.5	12.7	2-13	0.1-0.9	24380	8	24335M	12	---	---		
								24336M	4	24338	4	
			3-9	0.2-0.6			4	24335M	12	---	---	
								24336M	4	24338	4	
			3-14	0.2-1.0		8	24335M	12	---	---		
							24336M	4	24338	4		
			5-14	0.3-1.0	24906	6	24335M	12	---	---		
							24336M	4	24338	4		
			7-14	0.5-1.0	25915	8	24335M	12	---	---		
									24336M	4	24338	4
			8-15	0.6-1.0					24335M	12	---	---
									24336M	4	24338	4
	9-15	0.6-1.0		6	24335M	12	---	---				
					24336M	4	24338	4				
	10-15	0.7-1.0	25940	6	24335M	12	---	---				
					24336M	4	24338	4				
	11-15	0.8-1.0	24654	8	24335M	12	---	---				
					24336M	4	24338	4				
	12-16	0.8-1.1	24654	8	24335M	12	---	---				
					24336M	4	24338	4				
		0.75	19.1	4-15	0.3-1.0	24380	6	24335M	12	---	---	
								24336M	4	24338	4	
	3-9			0.2-0.6	25915	4	24335M	12	---	---		
								24336M	4	24338	4	
4-13	0.3-0.9			24906			24335M	12	---	---		
								24336M	4	24338	4	
5-14	0.3-1.0					24335M	12	---	---			
						24336M	4	24338	4			
6-14	0.4-1.0			25915	6	24335M	12	---	---			
								24336M	4	24338	4	
7-15	0.5-1.0							24335M	12	---	---	
						24336M	4	24338	4			
8-15	0.6-1.0	21819	4	24335M	12	---	---					
				24336M	4	24338	4					
9-16	0.6-1.1	25940	6	24335M	12	---	---					
					24336M	4	24338	4				
10-15	0.7-1.0	41825	8	24335M	12	---	---					
					24336M	4	24338	4				
11-17	0.8-1.2	24654			24335M	12	---	---				
					24336M	4	24338	4				
12-18	0.8-1.2	24654	8	24335M	12	---	---					
					24336M	4	24338	4				

Pneumatic Actuators



EB0134



EB0135

EB0022

Figure 15. Dimensional Drawings

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